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Application of market models to network equilibrium problems

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Abstract

© Springer International Publishing AG, part of Springer Nature 2018. We present a general two-side market model with divisible commodities and price functions of participants. A general existence result on unbounded sets is obtained from its variational inequality reformulation. We describe an extension of the network flow equilibrium problem with elastic demands and a new equilibrium type model for resource allocation problems in wireless communication networks, which appear to be particular cases of the general market model. This enables us to obtain new existence results for these models as some adjustments of that for the market model. Under certain additional conditions, the general market model can be reduced to a decomposable optimization problem where the goal function is the sum of two functions and one of them is convex separable, whereas the feasible set is the corresponding Cartesian product. We discuss some versions of the partial linearization method, which can be applied to these network equilibrium problems.

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Keywords

Componentwise steps, Divisible commodities, Elastic demands, Existence results, Market models, Network flow equilibria, Partial linearization, Price functions, Variational inequality, Wireless communication networks

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